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Extreme conditioning programs and the tactical athlete

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Extreme Conditioning Programs and the tactical athlete

DR Rob Orr
BLUF: Extreme Conditioning Programs have a time and place but are not the only time and place and the potential use must be considered against safer and potentially more effective ways of obtaining desired tactical conditioning.
What are ECPs?

‘ECPs are characterised by high-volume aggressive training workouts that use a variety of high intensity exercises and often timed maximal number of repetitions with short rest periods between sets’

Cult like status – esp communal ones
Cult like status – esp communal ones

EVIDENCE BASED . TACTICALLY TESTED . OPERATIONALLY PROVEN
Cult like status – esp communal ones

CROSSFIT??
I PLAY REAL SPORTS...
I AM NOT TRYING TO BE THE BEST AT EXERCISING

CROSSFIT
Fuck form!

EVIDENCE BASED . TACTICALLY TESTED . OPERATIONALLY PROVEN
Cult like status – esp communal ones
What is CrossFit?

A fitness company based in Washington, District Of Columbia. founded by Greg Glassman in 2000

CrossFit, Inc.
• Licenses the CrossFit name to gyms for an annual fee and
• Provides specific training to certify trainers.

CrossFit makes use of a virtual community Internet model interacting through specific social media
What is Shaun T?

Is a Commercial home exercise regime promising results in 60 days (or only training 25 mins a day)
Max interval training 3-4 minutes high intensity work
followed by 30 seconds of recovery
A product of Beachbody LLC, an American multinational corporation that uses multi-platform marketing to sell
fitness, weight loss, and muscle building home-exercise
What is P90x?

Tony Horton’s P90x is a commercial home exercise regime promising results in 90 days.

A product of Beachbody LLC, an American multinational corporation that uses multi-platform marketing to sell fitness, weight loss, and muscle building home-exercise.
• Do these programs work?
  • Are they effective?
  • Are they safe?
• Are they better than the current traditional methodologies?
Functional movement…
Glassman (2007)
Some of the claims: CrossFit

Evidence-Based Fitness
By Greg Glassman

In this excerpt from one of his talks at a recent CrossFit certification seminar, founder Greg Glassman discusses the methods and rationale of CrossFit. Fundamentally, what we are about, he explains, is evidence-based fitness. Here he breaks that claim down into its constituent parts and explains the logical, scientific basis of the CrossFit system for advancing human performance. To evaluate any such system, there are three key elements that must be assessed:

1) Safety: the program's record for injury avoidance-- and prevention.
2) Efficacy: its results, or the adaptations it produces.
3) Efficiency: how long it takes to achieve those adaptations.

“If you find the notion of falling off rings and breaking your neck so foreign to you, then we don’t want you in our ranks”

“It can kill you. I’ve always been completely honest about that”

Glassman cited by Cooperman (2005)
Evidence-Based Fitness

By Greg Glassman

For a fitness program to have meaning, those three elements must be supported by measurable, observable, repeatable data. Moreover, its methods, outputs, and criticisms must be transparent, or available for anyone to see and evaluate. These are the fundamental bases of scientific inquiry and of rational argument and evaluation, and (despite the unempirical, profit-driven nature of so much of the silliness that pervades the fitness industry), they are necessarily the requirements of any fitness program that claims to make you fitter.

What is Evidence Based?

EBP is informed by:

- HIGH QUALITY research
- Professional knowledge and reasoning
- Knowledge derived from various sources
Evidence?

Quality of Evidence: Testimonials

... I have always found it challenging to make time for more than one form of fitness training. Crossfit XXXXX was a revelation for me: a single hour-long workout to address cardio, strength, flexibility, etc. I feel more generally fit than I have in a long time, I have lost 8kg of fat, and I am writing this while wearing a suit I have not fitted into in 5 years. Do yourself a favour – give it a try.

— Alan
Evidence?

Quality of Evidence: Testimonials

I am currently on Day 11 of Insanity and I feel like my upper body looks more toned.

— Jodi
Evidence?

Quality of Evidence: Before and After

BEFORE

LOST
30 lbs.*
NATE G. / AGE: 32

*Results may vary

AFTER

BEFORE

LOST
32 lbs.*
JAMIE R. / AGE: 26

*Results may vary

EVIDENCE BASED · TACTICALLY TESTED · OPERATIONALLY PROVEN
Evidence?

Quality of Evidence: Literature (Bias?)

EVIDENCE BASED . TACTICALLY TESTED . OPERATIONALLY PROVEN
Literature Search

Quality of Evidence: Literature

Literature Search of Peer Reviewed Literature:

Terms: CrossFit, P90x, Gym Jones, Shaun T, ‘Extreme Conditioning’

Results:

• 3 Journal Articles, 4 Defence Papers, 5 Abstracts
  o 7 Studies
  o 5 Discussion Papers
Abstract

Evaluation of Muscular Endurance, Agility and Flexibility in Healthy Trained CrossFit and Weight Trained Individuals


Subjects:
Males - CF=9: WT=7

Method:
3-6 sessions / week min of 6/12
O/E: Push Up, Chin Up, T Test, Sit and Reach

Results/Conclusion:
XFit significantly more Chins than WT (Type of Chins?)
No other significant differences
Abstract

Energy Expenditure of a High Intensity Cross Fit workout compared to a traditional Aerobic Workout

Subjects:
Males=10 : Females=9 (trained)

Method:
30 mins Run @70% VO2max / 12 Min XFit workout

Results/Conclusion:
TOTAL EE higher in Run Group
High EE on a per min basis in XFIT
XFIT worked harder based on HR, RPE and VO2
Abstract

CrossFit vs Resistance-Trained Individuals: Evaluation of Strength and Power

Arnett, et al. (2013).

Subjects:
Males - CF=9: WT=7

Method:
3-6 sessions / week min of 6/12
O/E: 1RM Bench Press, 1 RM Squat, Med ball shot put, Vertical jump and Margaria-Kalamen Test

Results/Conclusion:
No other significant differences
Abstract

Comparison of Aerobic and Anaerobic Power in CrossFit and Weight Trained Individuals


Subjects:
Males - CF=8: WT=6

Method:
3-6 sessions / week min of 6/12
O/E: Aerobic (Bruce Treadmill) and Anaerobic (Wingate Anaerobic) Power

Results/Conclusion:
No other significant differences between CF and WT in Aerobic and Anaerobic Power
Abstract

Metabolic and Cardiovascular Demands of a Named CrossFit workout “Cindy”


Subjects:
Males=10 : Females=9 (3 months training)

Method:
Completed “Cindy”
5 Chin ups, 10 Push Ups, 15 Air Squats for 20 mins
O/E: VO2; HR; Kcal.min-1

Results/Conclusion:
Ave 68% VO2max, 170.8 bpm, 260.6 Kcal total
ASCM Classify Vigorous Activity as between 64-90% VO2max
Command and General Staff College Study

Cross Fit Study


Subjects:
Males=9 : Females=5 (3 Unit-Nil; Mod-Nil, Fit-Nil to Exp)

Method:
Completed 6 Weeks (min 4, max 5 XFIT sessions)
APFT (Push Ups, Sit Ups and 2mi Run) + XFIT measures (% Average Power)

Results/Conclusion:
Push ups: ave ↑ 7.3% (4.6: 20-107): 2 (14%) ↓
Sit Ups: ave ↑ 4.8 (3.9: 50-110): several ↓
2mi Run ?
Limitations of this paper:
- Small sample sizes
- Missing data (2mi Run)
- No control group
- No alternate group for comparison (why is this better?)
- Does not account for general adaptation syndrome to new stimulus (71% none to some Xp)
- NO statistical analysis
Crossfit-based high intensity power training improves maximal aerobic fitness and body composition


Started: 54 male/female participants
Finished: 45 (83%) participants, Male=23:Female=20
‘Injured’? from non-completers: 9 (17%)

Method:
CrossFit styled? Sessions for 10 weeks
Vo2max and % Body Fat (plethysmography)
Paleo diet

Results/Conclusion:
↑ in Vo2 / ↓ % Body fat
Males:43.1 to 48.96 ml.kg.min/ 22.2 to 18.0%
Males:35.98 to 40.22 ml.kg.min/ 26.6 to 23.2%
Crossfit-based high intensity power training improves maximal aerobic fitness and body composition

Smith, et al. (2013).

• Limitations of this paper:
  • Insufficient detail on training parameters (CrossFit training parameters) – Fig 1 and Table 6 data?
  • Did not define ‘Injured’
  • No control group
  • No alternate group for comparison (why is this better?)
  • Also on paleo diet
Currently no evidence to show ECP method superior to any other training method

ECPs do not appear to represent training programs likely to improve operational tactical ability

There is evidence to support the use of traditional training methods in a tactical population.
Physicians and primary care and rehab providers have identified a potential disproportionate risk of musculoskeletal injury – esp for novices.

While some literature may suggest a higher incidence of injury from ECPs there is not yet sufficient evidence to make this claim definitive.

ANY training regime (even going for a run) can lead to injuries if performed incorrectly.
Safety?

CrossFit gym craze running up injury toll

KATHLEEN DONAGHEY

It’s the latest extreme fitness “cult” turning couch potatoes into hardcore machines.

Devotees of CrossFit call themselves the fittest people on Earth as they powerlift huge weights, swing kettlebells and climb ropes.

But some experts warn the high-intensity exercise craze, which began with the military elite and moved into the suburbs, is causing serious injury.

Fitness guru and celebrity trainer Lee Campbell said CrossFit was “injury-plagued” as ordinary people pushed themselves to the limit.

Mr Campbell, who has worked as an army trainer, said there was an alarming trend towards shoulder injuries, with some requiring reconstructive surgery.

The toll, which is “getting bigger each day”, extended to hips, knees and backs because of poor technique and lack of supervision.

“We stopped it (this style of training) in the army in the ’90s because of the injury toll,” said Mr Lee, from reality TV shows Celebrity Overhaul and Big Extreme Makeover.

Physiotherapists also have noted a “high” injury rate and...
Safety?

Compo awarded for 'jumping squat' knee injury

By Ewan Gilbert
Updated Tue 17 Sep 2013, 5:14pm AEST

A Canberra man has been awarded compensation of more than $250,000 after he hurt his knee during an exercise class.

In 2005, Geoffrey Walker, 56, enrolled in a personal training course at the Canberra Institute of Technology (CIT).

As part of the course, he was asked to perform "jumping squats", which involve crouching and then jumping up and down.

It was an exercise that the class's own textbook warned was risky and designed for elite athletes.

Mr Walker said during the exercise he felt a crunching in his left knee, that left him with long-term pain and eventually required surgery.

Mr Walker took CIT to court, blaming them for breaching their duty of care by making him perform the dangerous routine.

But CIT said Mr Walker should have expected to engage in tough exercises and that he had signed a waiver for any injuries suffered.

The ACT Supreme Court found that despite Mr Walker having signed an indemnity form, he was still entitled to sue for damages.

Topics: courts-and-trials, act, canberra-2000
First posted Tue 17 Sep 2013, 4:17pm AEST
Safety?

Manila Bulletin
May 20, 2010

ACC-NO: 226818806
LENGTH: 234 words

HEADLINE: Heat stroke claims life of Army recruit during fitness tests;
Main News

BODY:
An Army recruit died of heatstroke while 16 others were hospitalized for exhaustion and dehydration while undergoing fitness tests Wednesday in what weather experts said was one of the hottest days of the year.
Lack of periodisation

• If all sessions are maximum intensity (AFAP/AMAP) how can volume and intensity be manipulated and the process of periodisation applied.

• Periodisation has been found to be effective at increasing performance in athletes (Soungatoulin, et al; 2003), and military personnel (Orr, 2010) and is recommended by the ASCM...

‘It has been shown that systematic variation in volume and intensity is most effective for long-term progression’ (ACSM, 2009, p.688)
Logic for exercise choices/order?

- Concern regarding impingement
- NOTE: These concerns can also occur in other training platforms – Rotator Press in Body Pump as an example

The Kipping Pull Up

EVIDENCE BASED . TACTICALLY TESTED . OPERATIONALLY PROVEN
• How many repetitions with potentially harmful technique?
Logic for exercise choices/order?

- The potential for injury is higher when the performance requirement is greater than the movement ability (e.g., at the joint)
Logic for exercise choices/order?

- Many WODs defy evidence based research for exercise order and rest and recovery.

_A snatch is an explosive exercise designed to train power development. 30 Reps is endurance. You do not use an explosive exercise to train endurance; there are more effective and safer choices..._ 
..._It is just random; it makes no sense_

_Cosgrove, A sited by Knipscher (2010)_
SATURDAY 130921
Five rounds of:
  100 meter Sprint
  Clean & jerk, 1 rep
  Max reps Muscle-up

SUNDAY 130922
Three rounds of: "Fight Gone Bad!"
  -Wall-ball, 20 pound ball, 10 ft target (Reps)
  -Sumo deadlift high-pull, 75 pounds (Reps)
  -Box Jump, 20" box (Reps)
  -Push-press, 75 pounds (Reps)
  -Row (Calories)

MONDAY 130923
For time:
  45 pound barbell Overhead squat, 50 reps
  100 Abmat sit-ups
  115 pound Overhead squat, 25 reps
  50 Toes-to-bar
  185 pound Overhead squat, 10 reps
  20 GHD sit-ups

- Leg load?

Evidence supported recommended recovery for muscle after loading?
Logic for exercise choices/order?

- While exceptional in general purpose fitness and its ability to provide challenging, primalistic workouts soldiers enjoy, ECPs fall short in specific programming required to develop the ability to start, stop, change direction, get up, get down and other tasks that soldiers have to perform in full spectrum operations.
Logic for exercise choices/order?
Logic for exercise choices/order?

- Missing elements required of tactical personnel (eg load carriage)
  - To maintain load carriage capability it is recommended that a LC specific session every 7-14 days (Orr, et al. 2010, Knapik et al., 2012).
  - Some evidence that other forms of conditioning do have limited value
Noted benefits

- ECPs are often multifaceted programs utilising various forms of resistance and cardiovascular training exercises.
- The training pace and exercise intensities of ECPs are challenging.
- ECPs provide a variety of training activities that war-fighters BELIEVE will promote better combat readiness.

Led to CHAMP/ACSM High-Intensity Training Workshop
Led to CHAMP/ACSM High-Intensity Training Workshop

- Noted detractors
  - Certain concepts of ECPs violate recognised and scientifically validated conditioning frameworks (like periodisation, rest and recovery periods);
  - Frameworks that have a strong level of evidence supporting their use.
  - Do not include all the conditioning needs of a soldier (e.g. LC).
  - Do not consider individual influences (Unit PT, workday fatigue).
  - Promote speed of movement in competitive circumstances and coupled with fatigue from minimal rest and maximal effort can lead to early technical movement failure, increased stress and strain on the body and the risk of a debilitating injury.
Recommendations for use

• Determine whether the gains (specific to the overarching training goal) from the ECP will outweigh the risks

• Introduce ECP slowly to new participants (regardless of fitness)

• Individualise supplemental conditioning (job specific)

• Ensure suitable rest and recovery
  * Ensure recovery before any arduous work task/event

• Monitor closely for overtraining signs and symptoms (as you should for any program)
Recommendations for use

• When designing a unit/stations (or an individual’s) physical conditioning program, YOU must consider:
  • What is the measurable goal of the program (aesthetics is a diet and fitness industry construct NOT an operational one)
  • How can I effectively AND safely condition personnel to meet these goals (risk v benefit)
• Make the personnel you are training fit and capable because of their training not in spite of it
• Think about the long term impact of this training on the member (soldier/officer for life)
References


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CrossFit vs Resistance-Trained Individuals: Evaluation of Strength and Power Medicine and Science in Sport and Exercise, 45(5), S675, p.156


Key, K. J. (2011). Return on investment: ensuring Special Forces can fight another day.


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